Contribution ID: **160** Type: **Parallel session talk**

Latest Magnetic Monopole Search Results from NOvA

Monday 21 August 2023 10:00 (15 minutes)

The existence of the magnetic monopole has eluded physicists for centuries. The NOvA Far Detector (FD), used for neutrino oscillation searches, also has the ability to identify magnetic monopoles. With a surface area of 4,100 m^2 and a location near the earth's surface, the 14 kt FD provides us with the unique opportunity to be sensitive to potential low-mass monopoles unable to penetrate underground experiments. We have designed a novel data-driven triggering scheme that continuously searches the FD's live data for monopole-like patterns. At the offline level, the largest challenge in reconstructing monopoles is to reduce the 148,000 Hz speed-of-light cosmic ray background. In the absence of any signal events in a 95-day exposure of the FD, we set limits on the monopole flux of $2 \times 10^{-14} \mathrm{cm}^{-2} \mathrm{s}^{-1} \mathrm{sr}^{-1}$ at 90% C.L. for monopole speed $6 \times 10^{-4} < \beta < 5 \times 10^{-3}$ and mass greater than 5×10^{8}GeV. In this talk, I will review the current monopole results and discuss the sensitivities of future searches using more than 8 years of collected FD data.

Collaboration / Activity

NOvA

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Session Classification: T10 Searches for New Physics

Track Classification: Searches for New Physics